Preface for AFSI-LR-RM2016-12/1

I. Purpose and content

The purpose of Library Reference AFSI-LR-RM2016-12/1 is to provide the supporting materials used in the Declaration of T. Scott Thompson dated November 14, 2016. The contents are broken into six separate analyses. The data required for each analysis is provided in this material along with the analysis. The statistical analysis is implemented in a mixture of code using R and Stata languages.

II. Organization

The contents of these supporting materials are organized into the following six folders, each of which corresponds to a specific analysis in Dr. Thompson's report:

Folder name	Corresponding analysis
"Volume on truck by DOW and stop"	Figure 1
"USPS Route data"	Figure 2
"Alternative capacity and regression specifications"	Figures 3 and 4, population model in paragraph 58
"Simulation-PTP inter-node"	Figure 5
"Simulation route charts"	Appendix A
"Simulation-Brattle baseline"	Footnote 17

Each of the above folders has been compressed in a .zip archive containing all materials required to replicate the analyses start to finish, as well as files containing the completed analysis reported in the text of the report.

III. Setup

Each folder is divided into three main sub-folders as follows:

- Input Data required for analysis, contents vary depending on analysis as detailed below
- Scripts Computer code to implement the statistical analysis. If the processing requires multiple steps, there may be separate subfolders – e.g. to separate the R code used to generate simulated data from the Stata code used to sample data and run regressions
- Output Program output, both intermediate and final results. As with the scripts folders, there may be separate output subfolders – e.g. to separate data generated by simulation routines from sample datasets subsequently drawn from those simulated data

IV. Specific contents of files

Each of the following subsections outlines the files and contents files in each folder. Many of the inputs and code rely on material provided in the Neels and Powers backup materials. These are summarized in UPS-RM2016-12/1 Preface.pdf. The simulation and sampling programs generate large amounts of data. These files have been omitted to reduce the total size of files produced – this is noted in the listings below. Log files generated by the Stata code each time it is run have also been omitted.

The folder structure outlined below and contained in the .zip archives will need to be reproduced in order for the programs to operate properly. All of the Stata code is set up to be run from a single file called “00 Run.do” that calls subsequent Stata programs in the order indicated by the leading index number in their file names. The R code files with leading index number “01” will call any subsequent code files required for complete execution. Proper base path names will also have to be supplied at the points indicated in the code files in order for them to execute properly.

Volume on truck by DOW and stop – Figure 1

Folder	Subfolder	Files and description
Input	2 Quarterly Intermediate	Quarter 1 Simulation Data.csv
Scripts		01 create route volume charts.R *This code reads one quarter of simulation data provided in the Neels and Powers backup and produces a chart corresponding to Figure 1.*
Output		Vol and cap-Zone A, Route part3-line chart.png

IV.A. USPS Route data – Figure 2

Folder	Subfolder	Files and description
Input		Docket.No.2010.1.HCR.Materials.xlsx This file contains three sheets of data compiled from docket USPS-LR-N2010-1.8 (http://www.prc.gov/dockets/document/67438). The specific files used from this docket were HCR_FREQ.xls and TY09.TCSS.extract.xls.
Scripts		00 Run.do 01 process route data.do 02 analyze route data.do *This code loads the data from the input Excel spreadsheet and produces statistics corresponding to Figure 2.*
Output		01 process route data.log [omitted] 02 analyze route data.log [omitted] descriptions.dta route_data.dta summary_tables.xlsx

IV.B. Alternative capacity and regression specifications – Figures 3 and 4, paragraph 58

Folder	Subfolder	Files and description
Input	Simulation data (from Neels and Powers)	2- Simulation Dataset.csv
Scripts	Regressions and sampling	00 Run.do 01 Data processing and Sampling.do 02 Regressions - Brattle baseline.do 02a Regressions - drop quarter dummies.do 02b Regressions - Use DOW capacity measure-DOW aggregation.do 02c Regressions - Brattle baseline capacity with DOW aggregation.do 03 Gather results.do *This code executes data processing to add measures to the Neels and Powers-supplied simulation datasets (required for subsequent calculations), implements the sampling algorithm supplied in the Neels and Powers Backup, then runs the alternative regression scenarios depicted in Figures 3 and 4, and referenced in paragraph 58.*
Output	Full simulation data with DOW capacity.dta [omitted]	
	Regressions	01 Data processing and Sampling.log [omitted] 02 - Brattle baseline.dta 02 - Brattle baseline.log [omitted] 02 - Brattle baseline.xlsx 02a - drop quarter dummies.dta 02a - drop quarter dummies.log [omitted] 02a - drop quarter dummies.xlsx 02b - Use DOW cap. measure - DOW aggregation.dta 02b - Use DOW cap. measure - DOW aggregation.log [omitted] 02b - Use DOW cap. measure - DOW aggregation.xlsx 02c - Brattle baseline cap with DOW aggregation.dta 02c - Brattle baseline cap with DOW aggregation.log [omitted] 02c - Brattle baseline cap with DOW aggregation.xlsx combined_regression_results.dta combined_regression_results.xlsx summary_regression_results.dta
	Sampling data	BW_Sample XX SR YY.dta [omitted]

		401 files in total. "XX" refers to the sample number, and "YY" refers to the proportion of the population sampled.

IV.C. Simulation-PTP inter-node – Figure 5

Folder	Subfolder	Files and description
1 – Data Sources	Lettermap.csv Multipliers.csv	
Scripts	simulations	01 Create Variability Simulation Dataset.R 01a PTP inter-node routing.R *This code modifies the Neels and Powers-supplied simulations by adding an alternative point-to-point protocol for inter-regional mail transport. Other modifications were made to enhance processing speed.*
	Regressions and sampling	00 Run.do 01 Data processing and Sampling.do 02 Regressions - Brattle baseline.do 02a Regressions - drop quarter dummies.do 02b Regressions - Use DOW capacity measure-DOW aggregation.do 03 Gather results.do *This code executes data processing to add measures to the generated simulation datasets (required for subsequent calculations), implements the sampling algorithm supplied in the Neels and Powers Backup, then runs the alternative regression scenarios depicted in Figure 5.*
Output	Full simulation data with DOW capacity.dta [omitted]	
	Simulation data	Quarter X Simulation Data.csv [omitted] Quarter X Simulation Data.dta [omitted] Simulation Dataset.csv [omitted] *24 quarterly simulation files in text delimited (.csv) format and Stata (.dta) format, plus aggregate file containing all simulated quarterly data concatenated.*
	Sampling data	BW_Sample XX SR YY.dta [omitted] *401 files in total. "XX" refers to the sample number, and "YY" refers to the proportion of the population sampled.*

	regressions	01 Data processing and Sampling.log 02 - Brattle baseline.dta 02 - Brattle baseline.log [omitted] 02 - Brattle baseline.xlsx 02a - drop quarter dummies.dta 02a - drop quarter dummies.log [omitted] 02a - drop quarter dummies.xlsx 02b - Use DOW cap. measure - DOW aggregation.dta 02b - Use DOW cap. measure - DOW aggregation.log [omitted] 02b - Use DOW cap. measure - DOW aggregation.xlsx combined_regression_results.dta combined_regression_results.xlsx summary_regression_results.dta

IV.D. Simulation route charts – Appendix A

Folder	Subfolder	Files and description
Input	1-data sources	Lettermap.csv Multipliers.csv
Scripts	01 Create Variability Simulation Dataset.R 01a create route charts.R *This code runs the setup routines contained in the Neels and Powers-supplied simulation code in order to map locations for the simulated population centers and the simulated mail routes connecting them.*	
Output	Map of inter-zone route.png Map of intra-zone route-Zone A.png Map of intra-zone route-Zone B.png Map of intra-zone route-Zone C.png Map of intra-zone route-Zone D.png Map of intra-zone route-Zone E.png Map of intra-zone route-Zone F.png Map of intra-zone route-Zone G.png Map of intra-zone route-Zone H.png Map of intra-zone route-Zone I.png Map of intra-zone route-Zone J.png	

IV.E. Simulation-Brattle baseline – Footnote 17

Folder	Subfolder	Files and description
1 – Data Sources	Lettermap.csv Multipliers.csv	
Scripts	simulations	Create Variability Simulation Dataset.R *This code implements a replication of Neels and Powers-supplied simulations.*
	Regressions and sampling	Sampling and regressions.do *This code implements a replication of the Neels and Powers-supplied sampling and regressions.*
Output	Simulation data	Quarter X Simulation Data.csv [omitted] Simulation Dataset.csv [omitted] *24 quarterly simulation files in text delimited (.csv) format, plus aggregate file containing all simulated quarterly data concatenated.*
	Sampling data	BW_Sample XX SR YY.dta [omitted] *401 files in total. "XX" refers to the sample number, and "YY" refers to the proportion of the population sampled.*
	regressions	BW replication sampling and regressions.log [omitted] BW replication Synthetic Variability Estimates.xls

V. Note on calculations made using non-public data

V.A. Purpose of the note

The Declaration of T. Scott Thompson on behalf of Amazon Fulfillment Services, Inc., dated November 14, 2016, includes the statement "I have confirmed, in fact, that the total "weighted volume" calculated by Drs. Neels and Powers for 2015 is exactly equal to the attributed volume variable costs for FY2015, for each type of highway contract, as it must be given the method for constructing weights." Verification of this statement requires access to some files in non-public

library reference UPS-RM2016-12-NP1. Rather than reproduce those files, this note describes how to confirm the statement quoted above using access to those files.

V.B. Calculation of total weighted volume for 2015

These calculations were made using file "weighted rpw charts.xlsx," which was produced in folder "2 - Weighted Volume Analysis." The calculations may be reproduced by inserting the Excel formula "=SUM(G22:G25)" into cell G27 on each of the tabs, "wvintrascf_rpw," "wvinterscf_rpw," "wvintrandc_rpw," and "wvinterndc_rpw." These produce total weighted volume for 2015 per the calculations of Drs. Neels and Powers for intra-SCF, inter-SCF, intra-NDC, and inter-NDC contracts respectively.

V.C. Calculation of attributed volume variable costs for 2015 for each type of highway contract

These calculations were made using file "CS14-NP-FY15.Proposed.Variabilities.xlsx," which was produced in folder "1 - Data Sources." The calculations may be reproduced by summing rows 2–30 of columns B, C, D, and E of tab "2015 Costs." These give total attributed volume variable costs for 2015 for intra-SCF, inter-SCF, intra-NDC, and inter-NDC contracts respectively, and these totals exactly match the sums described above calculated using file "weighted rpw charts.xlsx."